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Diversity of Decapod Crustacean from Dandi Coastal Region, West Coast of India

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Abstract

The present study has been carried out between September 2009 to August 2010 for the study of decpod crustacean diversity from Dandi creek, Maharashtra. Total five stations were selected for the collection of zooplankton (crustaceans) out of which 3 stations were in the creek and 2 stations were in offshore region. Decapod forms the second largest group in Dandi creek with their average percentage contribution to total zooplankton population. At station 1 the population ranged between (5652-23928/100) mg3 (av.13861.53/100) mg^3, at station (25637-40479/100) mg3 (av.15582.6/100)mg^3, station (33659-30790/100) mg^3 (av.17941.93/100) mg^3, station (45594-33721/100) mg^3 (av.15655.13 /100 mg^3) and station (53660-27400/100) mg^3 (av.12890/100) mg3. During the present investigation total 24 species of planktonic decapod belongs to 18 genera and 13 families were encountered in the zooplankton collection. Brachyuran larvae extremely dominated over the other decapods suggesting the potential for a good crab fishery in Dandi creek. The second abundant group was segrestid followed by pennaeids, anomurans and carideans. Scyllaridae, Stenopidae and Thalassinidae were poorly reported during the present investigation. Due to growth of several industries, industrial discharge and developmental activities, construction activities in the recent years around Dandi creek area the health of this ecologically important estuarine ecosystem is under threat.

Keywords: Decapods; Dandi ceek; Maharashtra; Westcoast; Crustacea.

Introduction

The order decapoda comprises of commercially important species of cray fish, prawns, shrimps, crabs and lobsters. Planktonic decapods constitute a major constituent of zooplankton community represented largely by larval stages including juveniles of economically important species. Hence seasonal variations of these larvae to a great extent are associated with the breeding periodicity of their adults. Some detailed on group with special reference to Acetes from nearshore waters off Mahim and Versova are available [1-2] reported planktonic species of decapods from the Arabian sea. Tiwari (1990) observed some important species of decapods from Dharamtar creek, west coast of India. Diversity of decapods from mangroves ecosystem of Uran (Raigad) was reported by Pawar (2012). Decapod crustaceans are a diverse and abundant taxon, yet this group has been little studied in the Arabian sea. The Arabian Sea has a monsoon climate. Minimum air temperatures of about (24-25)°C at the sea's surface occur in the central Arabian Sea in January and February, while temperatures higher than 28°C occur in both June and November. During the rainy season, which occurs when the southwest monsoon winds blow (April to November), salinities of less than 35 parts per thousand have been recorded in the upper 150 feet (45 meters) of the sea, while during the dry season (November to March), when the northeast monsoon winds blow, salinities of more than 36 parts per thousand have been recorded at the surface over the entire Arabian Sea north of latitude 5°, because evaporation exceeds the precipitation and riverine input taken together. The area faces a strong winds during monsoon seasons that blow from West to South-West. From May to September the monsoon winds blow all the times from South -west and these wind coming from Indian Ocean cause rain in greater part of India. The average wind velocity increases from 6.5 knots in May to about 13 knots in July, and then decrease to about 7 knots in September.

During the remaining months the prevailing winds are mainly the North-east monsoon winds. Their speed usually varies between (4.0-8.0) knots and they do not cause any significant rainfall on the West coast of India. The sea is generally moderate but in rainy season it is most choppy due to South westerly strong winds. The area receives about 95% rain due to south-west monsoon. The current of the Arabian sea depends upon the direction of the monsoon winds, the southwest monsoon cause the SW monsoon drift, moving the water in clockwise direction from the southwest. Along the coast this current is driven to the south. The current, which attains speeds of about 7 knots merges with the Southwestern monsoon current, flowing east between (5° and 10°) N. The current weakens and reverses direction during the north-east (winter) monsoon, the current being known as NE monsoon drift. During winter the waters move in northerly directions along the coastline.

Area of Study

Dandi is a coastal part of Palghar District located between 190, 48.041' North longitude and 720, 41.255' East latitude. It is 61.6 km away from Thane and 105 km away from busting city of Mumbai. The main occupation of the people in Dandi is fishery and agriculture. Several mechanized boats are available for fish catching around this coastal part of Thane. It is a famous fish landing centre in the Palghar district contributing (10-30) thousand tonnes of marine fishes captured by local fishermen per year (Fish Production Report Govt. of Maharashtra state, 2011-17). The important fishes of the region are Bombay duck, pomfrets, siaeinids, elasmobranchs, lobsters and prawns. The area has rich resourses of fishes, shrimps, prawns and crabs under the overlap environment and many bird's species are associated with this area. Due to growth of several industries, industrial discharge and developmental activities, construction activities in the recent years around Dandi creek area the health of this ecologically important estuarine ecosystem is under threat. Sampling stations were fixed using Global Positioning System (GPS) Model "Garmin GPS-Vista" USA. Total five stations (i.e.1, 2, 3, 4, and 5) were selected for zooplankton (crustacean) collection. Station 1 was located in the open sea facing Tarapur Atomic Power Station (TAPS), (190 47' 19.248''N and 720 40' 0.312'' E). The depth of water was from (13-18) meter at this station. Station 2 was also located in the sea in front of the mouth of Dandi creek (190 47' 24.7448''N and 720 40' 1.383'' E). The depth of water varied from (7-12) meters. Station 3 was close to the mouth of the creek (190 47' 31.141 N and 720 41' 17. 5474'' E). The water depth at this station varied from (6.5-11) meters. Station 4 was located in the creek near Dandi village, (190 47' 52.6453'' N and 720 41' 19.0925''E). The depth of water at this station varied between (2.5 and 4.5) meters, and station 5 was also located in the creek opposite the Gaondevi temple of Dandi village (190 47' 79.03''N and 720 41' 23.092''E). The depth of water varied from (2.25-3.5) meters.

Materials and Methods

Zooplankton samples were collected from 5 different locations, using H.T.Net with TSK [3] flow meter attached to the mouth of the net with the help of mechanized boat. Collected samples were immediately transferred in 500 ml of wide mouth clean plastic bottles and preserved in 5% buffered formalin. The volume of zooplankton was measured by displacement method after washing the zooplankton with distilled water and there after filtering through bolting clothes and water soaked on filter paper then transferring zooplankton in measuring cylinder having known volume of formalin. Volume of water filtered (V) through the plankton net was calculated by adopting the formula.

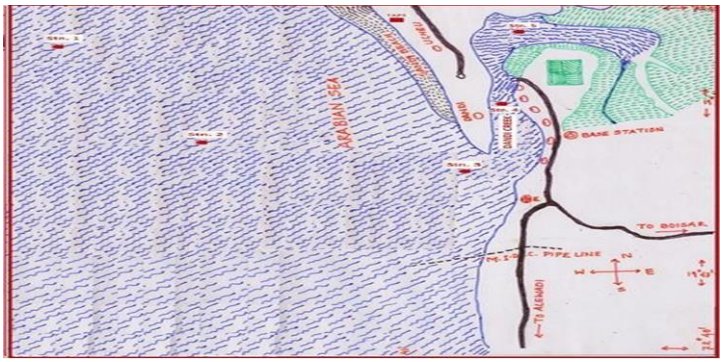

Figure1: Map showing sampling locations

V = (A X R) / k

Where A is the mouth area of the net, R is the revolutions of the flow meter and k is the constant (calibration value of the flow meter). Biomass of zooplankton was estimated by displacement method and expressed as ml/100 m^3. Depending on the size of the sample an aliquot of (25-50)% was taken using Folson Splitter and analysed for the common major groups while the entire sample was analysed for rare groups. Population density is represented as no/100 m^3. The number of decapod crustacean were counted using counting chamber with binocular compound microscope. Identification of decapod crustacean was done following the standard methods [4-7].

Results

Decapod forms the second largest group in Dandi creek with their average percentage contribution to total zooplankton population. Brachyuran larvae extremely dominated over the other decapods suggesting the potential for a good crab fishery in Dandi creek. The second abundant group was segrestid followed by pennaeids, anomurans and carideans. Scyllaridae, Stenopidae and Thalassinidae were poorly reported during the present investigation. Observed variation of decapod population at station 1 was in the range of (5652-23928/100) m3 (av.13861.53/100) m3. The highest population was observed in the month of August and the lowest in the month of October. Seasonal values of decapod population for premonsoon, monsoon and postmonsoon periods respectively were (10717.3, 15473 and 14527.3/100)m3.The population of decapods at station 2 ranged between of 5637 and 40489/100 m3 with an average of 15582.6/100 m3. The highest population was recorded in the month of November and lowest in

the month of July. Seasonal values of decapod population for premonsoon, monsoon and postmonsoon periods respectively were (13286, 10714.6 and 20224/100) m^3. Decapod population at station 3 varied between (3659-30790/100) m^3 (av.17981.93 /100) m^3. The highest population was recorded in the month of May and the lowest in the month of April. Calculated values for the three seasons were (17508.5/100) m^3 (premonsoon), (17208.5/100) m^3(monsoon) and (19651.5/100) m^3 (postmonsoon) Observed variation of decapods population at station 4 was between (5594 and 33721/100) m^3 giving an average of (15655.13/100) m^3. The highest value was observed in the month of October and the lowest in the month of September. Seasonal values for premonsoon, monsoon and postmonsoon periods respectively were (10356.8, 13782.8 and 21292.80/100) m^3. range of (3660-27400/100) m^3 for decapod population was observed at station 5 giving an average value of (12889.67/100) m^3 The highest population was obtained in the month of August and the lowest in the month of May. Seasonal values of decapod population for premonsoon, monsoon and postmonsoon periods respectively were (8492.5, 13377.2 and 15357.3/100) m^3. Invariably, postmonsoon season recorded high population of decapod at all stations in comparison to premonsoon and monsoon seasons. Invariably, postmonsoon season recorded high population of decapod at all stations in comparison to premonsoon and monsoon seasons. Species diversity. During the present investigation total 24 species of planktonic decapod belongs to 18 genera and 13 families were encountered in the zooplankton collection .They including *Acetes indicus, Penaeus penicillatus, P. semisculatus, P. merguiensis, P.monodon, Metapenaeus affinis, M. dobsoni, M. srtidulans, Panulirus polyphagus, Squilla mantis, Charybdis cruciata, Grapsus albolineatus, Pseudograpsus intermediates , Varuna litterata , Matuta planipes, Myomenippe hardwickii, Uca annulipes, Scylla serrata, Portunus sanguinolentus, Leptodius exaratus, Pagurus predeaux, Lucifer hanseni, L. typus and L. protozoaeae* . Decapod forms the second largest group in Dandi creek with their average percentage contribution to total zooplankton population. Brachyuran larvae extremely dominated over the other decapods suggesting the potential for a good crab fishery in Dandi creek. The second abundant group was segrestid followed by pennaeids, anomurans and carideans. Scyllaridae, Stenopidae and Thalas sinidae were poorly reported during the present investigation [8-13].

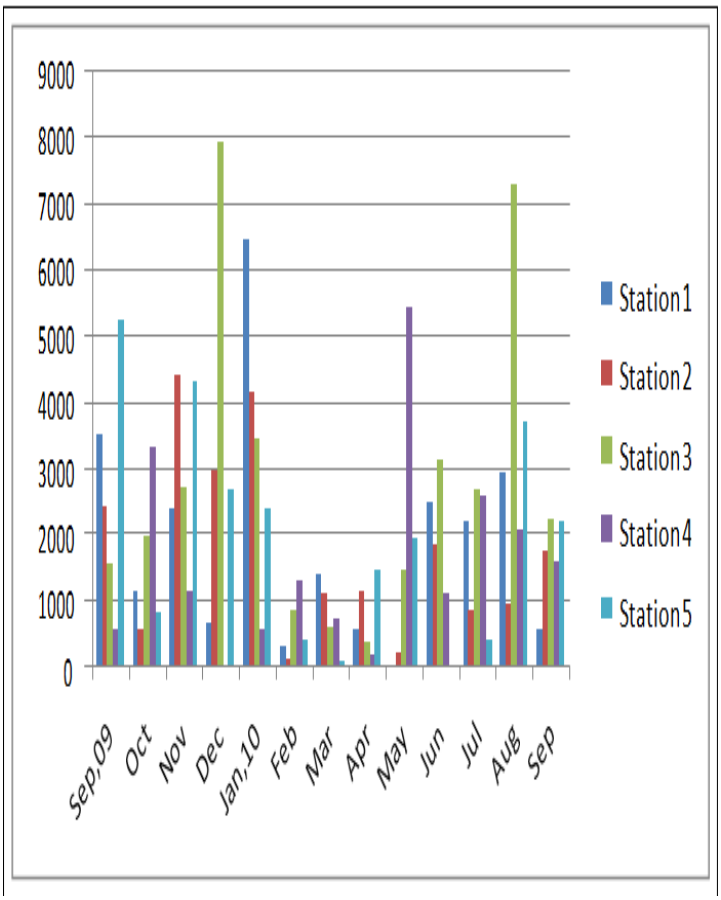

Figure 2 : Variation in decapods population (no/100) m3 at different stations during 2009-2010.

Table 1: Total population (no/100) m^3 and percentage contribution (in parenthesis) of decapods at different stations during 2009-2010.

Months	Station 1	Station 2	Station 3	Station 4	Station 5
Sep,09	16428(21.66)	16714(19.02)	22237(39.66)	5594(9.87)	7995(14.12)
Oct	5652(11.16)	8497(18.70)	9479(22.78)	33721(59.80)	6635(13.30)
Nov	20817(67.88)	40489(58.19)	23610(26.67)	23002(38.90)	27149(49.63)
Dec	20274(28.07)	15016(19.63)	23528(42.90)	10118(21.69)	10419(23.64)
Jan,10	11366(17.82)	16894(38.63)	21988(22.67)	18330(28.39)	17231(41.69)
Feb	7692(18.63)	13919(28.30)	4812(11.27)	12301(19.36)	10029 (-25.84)
Mar	15117(36.41)	25205(61.93)	30773(53.60)	10083(16.50)	8622(26.52)
Apr	8101(17.63)	(6628) (21.87)	(3659) (16.70)	(5698) (26.80)	(11659) (31.62)
May	11959(21.60)	7392(18.20)	30790(48.63)	13345(41.20)	(3660) 11.50
Jun	11962(21.30)	10110(20.63)	14407(27.83)	15895(38.70)	9039(26.30)
July	11230 (19.80)	5637(11.50)	18956(32.90)	23850(42.80)	11089(26.20)
Aug	23928(38.16)	14008(40.30)	20401(31.70)	8456 (-19.63)	27400(68.5)
Sep	13817(19.40)	7104(17.07)	10040(21.60)	15119(35.90)	11363(28.40)

Table 2: Species diversity of decapods at different stations during 2009-2010.

Sr.No	Decapod Sp.	Station1	Station 2	Station 3	Station 4	Station 5
		Inner Zone			Outer Zone	
1	*Acetes indicus,*	_	_	_	+	+
2	*Penaeus penicillatus,*	+	+	-	+	-
3	*P. semisculatus,*	+	-	+	_	
4	*P. merguiensis,*	-	-	+	-	
5	*P.monodon,*	+	+	-	+	_
6	*Metapenaeus affinis,*	_	_	+	+	+
7	*M. dobsoni, M. srtidulans,*	+	_	_	+	+
8	*Panulirus polyphagus,*	_	+	+	_	+
9	*Squilla mantis,*	+	_	_	+	+
10	*Charybdis cruciata,*	+	-	-	+	-
11	*Grapsus albolineatus,*	+	+		+	_
12	*Pseudograpsus intermediates ,*	-	_	+	-	+
13	*Varuna litterata ,*	+	_	+	_	+
14	*Matuta planipes,*	_	+	+	+	_
15	*Myomenippe hardwickii,*	+	+	_	_	+
16	*Uca annulipes,*	+	+	_	+	_
17	*Scylla serrata,*	+	+	_	+	
18	*Portunus sanguinolentus,*	+	+	_	_	+
19	*Leptodius exaratus,*	_	_	_	+	+
20	*Pagurus predeaux,*	+	+	_	-←	+
21	*Lucifer hanseni,*	+	+	_	+	
22	*L. typus*	_	_	+	_	
23	*L. protozoaeae*	-	-	+	_	-
24	*Acetes indicus,*	+	+	_	+	+

Conclusion

Crustacean play an important role in the food web as they are an important link between benthic and pepagic organisms, fish and birds. Crustaceans are of great direct and indirect importance to humans, the larger custaceans including shrimps, lobsters and crabs are use as food throughout Palghar distict and are therefore important to economies of local fishermen. Dandi is a famous fish landing centre of Thane district contributing about 30000 tonnes of marine fishes captured by the local fishermen per year of which 32 varieties are economically important. Fishes are main component of the food of people living in this coastal part of Thane district. Many fishes feed on marine algae, phytoplankton and some specially feed on varieties of zooplankton. Dandi creek is an ecologically important coastal ecosystem which is surrounded by heavily industrialized area of Tarapur. Many industrial establishments are cropping up along the coastal zone of Dandi creek and this may cause the problem of waste disposal into this important creek system. The ability of the creek to assimilate and disperse pollutants without modifying the ecosystem is a pertinent aspect to be monitored frequently.

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